FAA-E-2721/5a
October 27, 1983
Superseding
FAA-E-2721/5 dated
9/16/82

# DEPARTMENT OF TRANSPORTATION

## FEDERAL AVIATION ADMINISTRATION

## SPECIFICATION

## MICROWAVE LANDING SYSTEM GROUND EQUIPMENT TURNKEY FACILITY ESTABLISHMENT

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

SPECIFICATION

# MICROWAVE LANDING SYSTEM GROUND EQUIPMENT

Turnkey Facility Establishment

NOTE: This is Part 5 of 5 Parts in the FAA Specification on Microwave Landing System Ground Equipment. Each Part carries the basic number FAA-E-2721 plus a suffix number that identifies the individual Part. The five Parts of the MLS specifiation are:

| | |
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| FAA-E-2721/1 | MICROWAVE LANDING SYSTEM GROUND EQUIPMENT General Requirements. |
| FAA-E-2721/2 | MICROWAVE LANDING SYSTEM GROUND EQUIPMENT, Angle Guidance and Data. |
| FAA-E-2721/3 | MICROWAVE LANDING SYSTEM GROUND EQUIPMENT, Precision Distance Measuring Equipment, DME/P |
| FAA-2-2721/4 | MICROWAVE LANDING SYSTEM GROUND EQUIPMENT, Interface Control Document Guidelines. |
| *FAA-E-2721/5 | MICROWAVE LANDING SYSTEM GROUND EQUIPMENT, Turnkey Facility Establishment. |

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5-1-3.4 FAA Technical Representative (TR).- The Government will designate individuals as Technical Representatives for the various phases of the MLS turnkey project. The representatives so designated shall be the points of contact for the Government in their assigned areas.

5-1-3.5 Contractor responsibilities

5-1-3.5.1 Site Survey

5-1-3.5.1.1 Pre-survey conference.- Prior to the start of the site survey and evaluation, the contractor shall request a pre-survey conference with airport authorities and regional FAA representatives. The purpose of this conference is to ensure that all requirements relating to the specific site are identified and included in the CSER as required. Any site peculiarities such as unusual weather, wind, temperature extremes, jet blast vulnerability, and possible flooding should be identified. The contractor shall prepare and submit, as part of the request for a pre-survey conference, a preliminary site selection analysis. The preliminary site selection analysis shall be based on the information contained in airport drawings (5-1-.3.2.8). The analysis shall compare a minimum of three (3) facility locations for each station of the MLS. The analysis shall contain a description of the three facility locations, a description of possible effects of planned construction on existing airport facilities, and economic analysis based upon preliminary estimates, effect of possible airport expansion on the proposed installation, a listing of the advantages and disadvantages of each facility location, a summary discussion of each facility location and a recommendation as to the optimum facility location.

5-1-3.5.1.2 Site survey and evaluation.- For locations specified in the contract schedule, the contractor shall perform a site survey and evaluation to determine equipment and site locations for MLS installation and operation. The contractor shall include in the CSER complete details of the recommended facility locations. The CSER shall also include a description of alternate locations discussed during the pre-survey conference, and the reason(s) for selecting the recommended location as opposed to the alternative locations. Any recommendations to use a different antenna option than the one specified in the contract should be given to the Government at this time, and should also be included in the CSER. The contractor shall fulfill the specific requirements listed below.

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Federal Specification:

. QQ-C-806, Culverts and Underdrains, Corrugated Iron or Steel, Zinc Coated

(Information on obtaining copies of AASHO specifications may be obtained from the American Association of State Highway and Transportation Officials, 444 North Capital Street, N.W., Washington, D.C. 20001).

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(Information on obtaining copies of the National Electrical Code may be obtained from the National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 022 10)

5-2-3 REQUIREMENTS

5-2-3.1 Equipment and services to be furnished by the contractor.- The contractor shall provide all equipments, materials and personnel services for site preparation and plant construction in accordance with FAA-C-2454, Facility Site Preparation and FAA-STD-0 19, Lightning Protection, Grounding, Bonding, and Shielding Requirements for Facilities.

5-2-3.2 Site clearing and grading.- The contractor shall accomplish the clearing, grubbing, and grading required to prepare all sites for installation of the MLS subsystems, except work that has been identified as a responsibility of the Government or airport authority. Work shall be in accordance with the CSER and Section 2-1 of FAA-C-2454. The effort shall be limited to minor leveling and grading in the immediate area of the weatherproof enclosures and providing proper drainage of the site. Minor leveling and grading as used herein is defined as the movement of up to 150 cubic yards of earth without the need for truck hauling or the hauling by truck and placement of up to 50 cubic yards of earth.

5-2-3.3 Earthwork.- All excavation, filling and backfilling shall be accomplished in accordance with the engineering report, construction drawings, and Section 2-2 of FAA-C-2454. Excavated material not suitable or required for backfilling shall be disposed of by the contractor with the approval of the FAA TR.

5-2-3.3.1 Rock Excavation.- Rock excavation shall consist of the excavation of boulders having a volume greater than 1/2 cubic yard, or the excavation of ledge rock which cannot be removed without blasting, chipping, wedging or the use of rippers. Soft or decomposed rock which can be removed with a backhoe will not be considered under this item. For cable trenches, measurement for the purposes of payment shall be the length of the trench by a maximum width of 12 inches to the required depth. For pipe trenches, measurement for the purpose of payment shall be the length of the trench by a maximum width of 12 inches from either side of the pipe to the required depth. For foundations, measurement for the purposes of payment shall be a maximum of 12 inches greater than the length of the foundation by a maximum width of 12 inches greater than the width of the foundation,

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## 5-3-1 SCOPE AND SPECIFICATION

5-3-1.1 Scope.- Section 3 is one of three sections of FAA-E-2721/5 Microwave Landing System Equipment, Turnkey Facility Establishment. Section 3 contains the requirements and criteria for the installation and tune-up of a Microwave Landing System. This section supplements the General Requirements contained in Section 1 of: this specification. Any additional equipment furnished by the contractor not specifically identified herein shall nevertheless be the contractor's responsibility to install and tune-up under this specification.

5-3-1.2 Classification.- The Government will specify in the contract the type of MLS equipment to be installed at each location.

## 5-3-2 APPLIC ABLE DOCUMENTS

(a) Equipment Instruction Book

(b) Contractor% Site Engineering Report (CSER)

(c) Minimum Operational Performance Standards for Microwave Landing System (MLS) Airborne Receiving Equipment - RTCA/DO-177, July, 1981

## 5-3-3 REQUIREMENTS

5-3-3.1 Requirements.- The contractor shall. provide all labor, material and tools necessary to accomplish the installation, tune&p, ground check, preliminary flight check, commissioning flight check support, and facility data of the Microwave Landing System.

5-3-3.1.1 Equipment instruction books.- The equipment instruction books referred to in the following subparagraphs shall be distributed with the electronic equipment. The final instruction books will be printed by the Government with sufficient quantities shipped to the contractor for distribution with the equipment. If .final instruction books-are not available at the time the equipment is delivered, the contractor shall furnish one set of preliminary instruction books with each equipment.

### 5-3-3.2 Azimuth/DME/P Station

5-3-3.2.1 Electronic equipment.- The electronic equipment of the Azimuth/DME/P Station (including all antennas) shall be installed, tuned, and adjusted in accordance with the applicable equipment instruction books and the CSER.

5-3-3.2.2 Ground checking.- The contractor with FAA TR observing shall perform all ground tests necessary to determine that the Azimuth/DME/P equipment is tuned for optimum operation and that the performance is within the prescribed tolerances set forth in the equipment instruction books. The contractor shall perform all preliminary checks, including monitor adjustments prior to joint installation inspection and FAA flight inspection.

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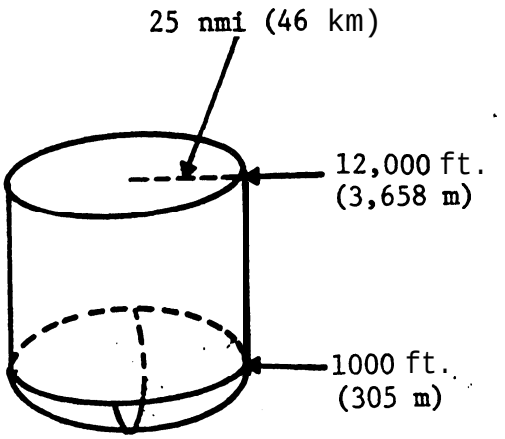
Table Ib. Minimum Preliminary Flight Check

1 Requirements for Distance Measuring Equipment.- The contractor shall demonstrate by flight check that the DME provides satisfactory identification and distance information within the following standard terminal service volumes defined by figures Ib-1 and Ib-2. DME flight check data may be gathered concurrent with profiles defined in Table Ia.

Figure Ib-1. Standard Terminal Service Volume

(refer to Figure Ib-2 for altitudes below 1000 feet (305 m))



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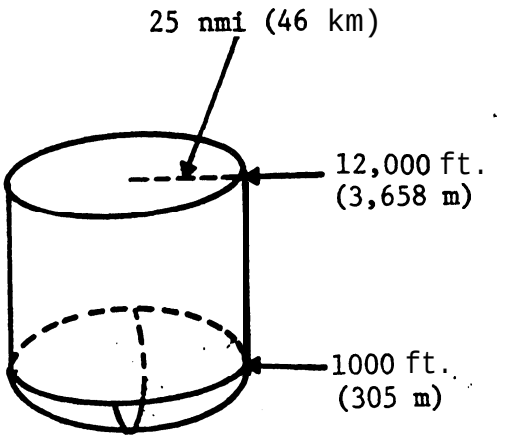

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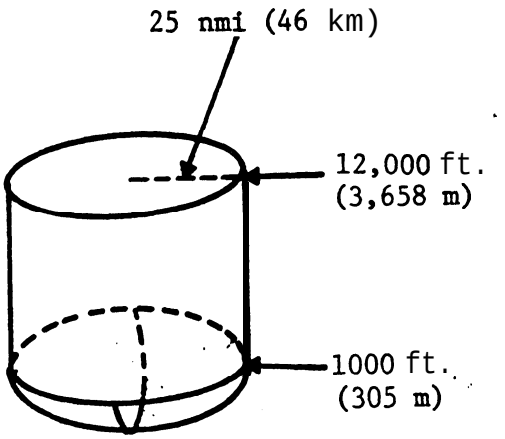

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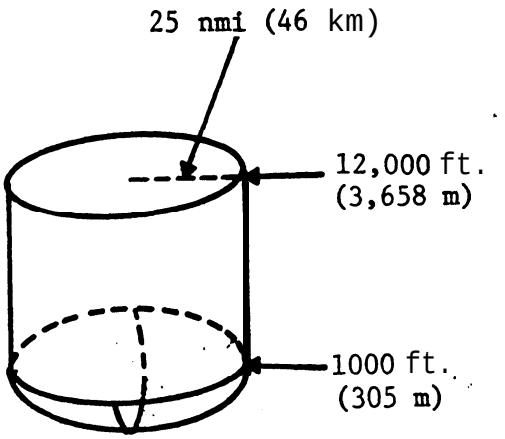

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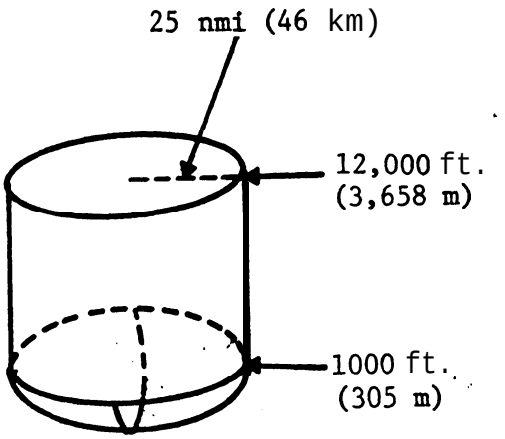

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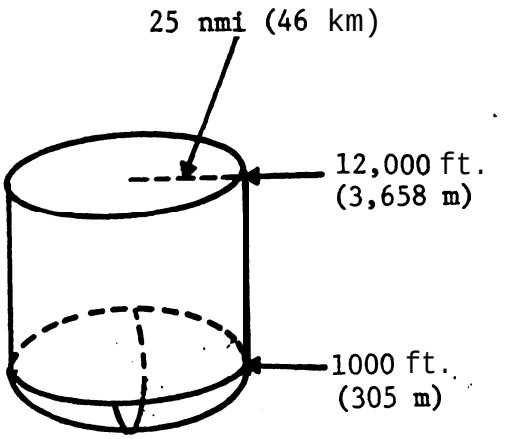

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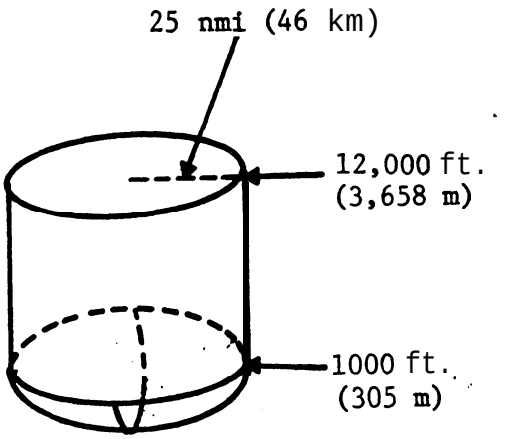

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